

Denver. Thunder-storms continued on the 23rd from Nebraska to Mississippi, Louisiana and northern Texas, and on the 24th, 25th, 26th and 27th from Texas to Alabama.

No. XI.—On the 28th, falling barometer in the Upper Missouri valley indicated the approach of this storm, and very light rains were reported from Utah to Nebraska, with a hail-storm below Fort Randall, D. T. At 7:35 a. m., of the 29th, it was probably central over the eastern portions of Wyoming and Montana, with a barometric trough extending eastward over the Lake region. Frequent thunder-storms were reported during the day from Dakota and Montana south and eastward to Texas, Alabama, Illinois and Michigan, with hail in Nebraska, Montana, Dakota, Iowa and Michigan. At Detroit, Mich., severe thunder-storm at 2:45 p. m.; during morning barometer fell steadily; 2 p. m., temperature 82° Fahrenheit, and heat overpowering, notwithstanding a steady west wind of 12 miles per hour; 2:45 p. m., wind suddenly veered from west to north, and in a few moments to northeast, increasing to 20 miles per hour; rain in torrents, flooding streets and basements, and washing away pavements, trees, curbing, &c.; 3:30 p. m., during a period of five minutes, the wind blew at the rate of 35 miles per hour, and some hail fell at the same time. The following hourly wind-velocities were reported: At Duluth, NE., 36, Breckenridge, SE., 29, and Toledo, NE., 42 miles. During the 30th the pressure continued diminishing over the Northwest and Lakes, and, at 11 p. m., an area, enclosed by isobaric curve 29.00 inches, was central in Dakota. Thunder-storms were occasionally reported from thence to Michigan and the Gulf States, with snow and hail in Montana and Utah. The following are some of the highest hourly wind-velocities: Indianola, S., 30, North Platte, SE., 40, Dodge City, E., 43, and Pike's Peak, W., 76 miles. On the 31st the central depression advanced to eastern Dakota, with a barometric trough extending southward over Indian Territory. Frequent and severe thunder-storms prevailed from Dakota, Minnesota and the Upper Lakes to the Gulf States, with hail in Wyoming. At St. Louis, S., 34, Breckenridge, SE., 41, and North Platte, 42 miles per hour were recorded. Cautionary Signals were ordered on the 29th at Duluth, Milwaukee, Chicago and Grand Haven, on the 30th, at Escanaba and Marquette, and on the 31st, as far east as Buffalo, the majority of which were justified. As this storm moved to the eastward it diminished very much in force.

TEMPERATURE OF THE AIR.

The isothermal curves, (in red,) upon chart No. II, illustrate the general distribution of the temperature of the air for the month. Mean temperatures received late and not given on the Chart are: for Fort Benton, 57°; Virginia City, 46.°4; Pike's Peak, 21.°4; Fort Sully, 61.°7; North Platte, 59.°6; Santa Fé, 55.°9; Mt. Washington, 33.°1. By referring to the table in the lower left-hand corner of the same chart, it will be seen that the average is below that for many years in New England, the South Atlantic States, along the Pacific coast, and in the St. Lawrence valley; nearly the same in the Middle Atlantic States, Gulf States and Upper Mississippi valley; above in the Lake region, Ohio valley, Tennessee and Missouri valley. Minimum and maximum temperatures, respectively, for the month, are given for the following stations, viz: Portland, Or., 36°, 82°; San Francisco, 45°, 81°; San Diego, 50°, 76°; Salt Lake City, 33°, 88°; Cheyenne, 27°, 81°; Denver, 32°, 85°; Pike's Peak, 2°, 39°; Santa Fé, 28°, 78°; Virginia City, 24°, 81°; Bismarck, 23°, 87°; Pembina, 22°, 57°; Fort Sully, 27°, 96°; St. Paul, 31°, 89°; Leavenworth, 37°, 87°; Duluth, 26°, 87; Marquette, 23°, 86°; Chicago, 35°, 87°; Detroit, 30°, 85°; Oswego, 31°, 91°; Pittsburgh, 27°, 91°; Memphis, 48°, 88°; New Orleans, 57°, 86°; Indianola, 58°, 87°; Eagle Pass, Texas, 72°, 102°; Key West, 70°, 91°; Savannah, 50°, 94°; Norfolk, 38°, 89°; Knoxville, 40°, 89°; Washington, 34°, 90°; New York, 34°, 83°; Boston, 34°, 86°; Eastport, 33°, 65°; Mt. Washington, 7°, 55°.

Ranges in Temperature.—The greatest ranges, from 61° to 69° Fahrenheit, are reported from western Pennsylvania to Minnesota and Dakota; the least ranges, 21° to 30°, from southern Florida to Texas, 26° at San Diego, and 32° at Eastport and Wood's Hole.

Frosts and ice, destructive to fruits and early vegetables, are reported as follows, viz: on the 1st, ice formed $\frac{1}{2}$ inch thick at Elmira, Ill., Atco, N. J., and West Chester, Pa.; at Ringgold, O., cherry, plum and apple trees, and at Morgantown, cherry, peach and plum trees, were injured by freezing; 2nd, 6th and 19th, at Santa Fé, tender vegetables damaged; 3rd, at La Grange, Tenn., (latest frost known,) fruit all killed, except cherries and grapes, at Corsicana, vegetation slightly damaged, and at Muscatine, Iowa, sweet potatoes and tomatoes killed; 15th, ice formed at Salt Lake City; 16th, asparagus frozen at Gardiner, Me.; 16th and 17th, at San Jose, Cal., grapes injured; 17th, a frost damaging vegetation at Carson City, Nev., and at New London, ice formed $\frac{3}{4}$ inch thick; 18th, at Kanab, Utah, peaches, apples, grapes, &c., killed—ice $\frac{1}{2}$ inch thick; 21st, potato vines killed at Viejas, Cal.; 23rd, Malone, N. Y., vegetables killed; 31st, squash vines killed at Plaistow, N. H. At Fayette, Miss., first May frosts for years on 3rd and 9th.

PRECIPITATION.

Upon chart No. III is represented the distribution of rain-fall and melted snow. The following figures were received after the printing of the chart, viz: Virginia City, 5.58; Pike's Peak, 4.73; Santa Fé, 0.83;

Mt. Washington, 7.83; Rio Grande City, Texas, 0.56; Eagle Pass, Texas, 1.27 inches. A table upon same gives the average of the month for this and many years. There has been a deficiency of .43 in. for the Pacific coast; .45 for the Lower Lake region and Missouri valley; .50 for the St. Lawrence valley; .55 for the Eastern Gulf States; .75 for the South Atlantic States; .95 for the Ohio valley; 1.05 for New England. An excess of .20 in. has been recorded for the Middle Atlantic States; .45 for the Upper Lake region; 1.00 for Minnesota; 1.65 for the upper Mississippi valley; 2.55 for Tennessee; 2.65 for the Western Gulf States.

Snow-fall.—At Colebrook, Conn., 4 in. on morning of 1st; Southington, Conn., 2 in. on 1st; Middletown, Conn., 1 in. on 1st; Vail, Ia., ground white on 1st and 4th; Florida, Mass., 2 in. on 1st; Fall River, Mass., $\frac{3}{4}$ in. on 1st; Shelburne, N. H., snow-storm 1st; Kensico, N. Y., 8-10 in. on 1st; Wappinger's Falls, N. Y., $\frac{1}{4}$ in. on 1st; Duluth, Minn., on 2d, heaviest fall at one time during season; Escanaba, Mich., heavy snow-storm 3d; Salt Lake City, heavy snow 31st.

Rainy Days.—The number of days, on which rain fell during the month, averages as follows: In New England, 16; Middle Atlantic States, 12; Southern States and Ohio valley, 10; Lake region, 15; Upper Mississippi valley 12; Missouri valley, 9; Rocky Mountain stations, 13. Only one light shower occurred at San Diego, and two at San Francisco, during the month, while sixteen days, on which more or less rain fell, are reported for Portland, Or. At Campo, Cal., and Stanwix, Arizona T_y, not any rain fell.

Cloudy Days.—The number varies, in New England, from 4 to 13; Middle States, 3, to 13; South Atlantic States, 2 to 9; Gulf States, 0 to 11; Tennessee and the Ohio valley, 2 to 12; Lake region, 4 to 13; Northwest, 0 to 13; Territories, 3 to 21.

Droughts.—At Litchfield, Mich., season backward and dry, but vegetation looks promising; Kanab, Utah, at close of month streams much lower than usual at this season, although much snow fell during the winter in the mountains, and crops will suffer unless rain falls to increase the streams.

Freshets.—Shreveport, La., rain-fall on 6th and 7th, 7.33 in., flooding the lower part of city and causing the greatest rise, (3 ft. 10 in., in 24 hours,) ever known in the Red river in the same space of time; 8th, Keokuk, Mississippi river 11 in. above "danger line," but not doing much damage; 9th, Ottawa river overflowed at Ottawa, Can.; 10th, dangerous freshet at Lancaster, N. H., in Connecticut river; 12th, dangerous freshets in New Hampshire and Maine—Connecticut river higher than for 25 years; 17th, at Shelburne, N. H., highest freshet in Androscoggin river in years; 20th, at Fort Lenton, since 17th, river has risen 29 inches; 21st, at Lyndon, Ill., Rock river 2 or 3 feet above usual stage for May; at Fort Sully, river rose 21 in., beginning of June rise; 22nd, freshets near Denver, and Golden, Col., severe rain-storm, damaging railroad, bridges, etc.; 25th, freshet in South Platte river, Nebraska; 30th, Portland, Or., the Wallamette river said to be within 3 feet of high water of 1862, (the highest on record,) all the cellars in lower part of town flooded; considerable damage also reported on the lower Columbia river; 31st, at Lunenburg, Vt., month wet and streams higher than usual.

RELATIVE HUMIDITY.

The average relative humidity for the month ranges at the Atlantic sea-coast stations from 71 to 81 per cent.; at the cities on the Atlantic coast and in the interior of the Atlantic States, 61 to 75; Gulf States, 69 to 76; Tennessee, Arkansas and Indian Territory, 61 to 69; Missouri, Upper Mississippi and Ohio valleys, 54 to 65; Lake region, 63 to 73; Minnesota, Dakota and plains of Nebraska and Kansas, 52 to 62; Rocky mountain stations, 42 to 66; Pacific coast, 65 to 76. *Dry Stations.*—Santa Fé, 42 per cent.; Denver, 43; Colorado Springs, 45; Salt Lake City, 48; Bismarck, 52; Fort Sully, 53; Cincinnati, 54; Louisville and Breckenridge, 55. *Moist Stations.*—Mt. Washington, 86; Atlantic City, 81; Barnegat, 78; Tybee Island, Kittyhawk and Long Branch, 77; Indianola, Cape Hatteras, Thatcher's Island and San Diego, 76.

WINDS.

Prevailing Winds.—By an examination of chart No. II it will be seen from which direction the winds have blown most frequently, the arrows flying with the wind. The following are some of those not on the chart, viz: At Key West from the E.; Rio Grande City, Tex., SE.; Pike's Peak, W.; Santa Fé, SW.; Fort Sully, SE.; Virginia City, SW.; San Diego, S.; Portland, Or., N.; Campo, Cal., W.; Stanwix, A. T., SW.

The *maximum velocities* and *tornadoes* are generally given in connection with the movement of low barometers. On Mt. Washington, during the evening of the 1st, the hourly wind velocity reached 102 miles. A gale was experienced on the 30th south of Bermuda, with the force 8, on the scale 0 to 10.

Total Movements.—The largest total movements of the air during the month, independent of direction, have been recorded at the following stations: Pike's Peak, 15,720 miles; Dodge City, 12,610; Indianola, 11,757; Cape Lookout, 11,061; Cape Hatteras, 10,487; Breckenridge, 10,318. The smallest total movements reported are: Wytheville, Va., 2,745 miles; Lynchburg, 2,911; Augusta, 2,961; Portland, Or., 3,057; Vicksburg, 3,123; Nashville, 3,170.